

## Wheat Market Outlook and Price Report: June 5, 2023

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### i) Background and Rationale for the Report

The following wheat market outlook and price report will be published on a weekly basis on the Sask Wheat Website. The report provides producers with an overview of world wheat markets, a market forecast, and benchmark prices at both the primary elevator and export positions (FOB Vancouver or elsewhere).

The report is made up of several sections. Following this section, a World Wheat overview is provided, which includes a summary of wheat market fundamentals, world production and trade, and a wheat market outlook. This is followed by several price tables, which include primary elevator bids at various Saskatchewan locations (Table 1), grain spreads (Table 2), and FOB port prices and basis (as measured by subtracting the primary elevator price (Rosetown) from the relevant port location price for individual crops) (Table 3). Table 3 is preceded by a description of the various assumptions, definitions and methodology used in arriving at the FOB port prices and in the export basis calculation.

### ii) Wheat Market Outlook June 5, 2023

#### AMIS<sup>1</sup> view of the 2022/2023 Global Wheat Market, June 2023

Wheat	FAO-AMIS		USDA		IGC		IN MILLION TONNES
	2022/23 est	2023/24 f'cast	2022/23 est	2023/24 f'cast	2022/23 est	2023/24 f'cast	
		1 Jun		12 May		18 May	
<b>Prod.</b>	<b>800.8</b>	<b>776.7</b>	<b>788.3</b>	<b>789.8</b>	<b>803.0</b>	<b>782.7</b>	
	663.1	638.2	650.5	649.8	665.3	643.7	
<b>Supply</b>	<b>1095.9</b>	<b>1087.4</b>	<b>1060.9</b>	<b>1056.0</b>	<b>1077.4</b>	<b>1065.6</b>	
	824.2	808.1	786.5	777.0	807.8	787.5	
<b>Utiliz.</b>	<b>779.7</b>	<b>780.3</b>	<b>794.7</b>	<b>791.7</b>	<b>794.5</b>	<b>794.5</b>	
	637.5	638.8	646.7	642.7	653.0	652.2	
<b>Trade</b>	<b>199.6</b>	<b>193.7</b>	<b>212.9</b>	<b>212.5</b>	<b>199.6</b>	<b>194.0</b>	
	188.1	186.7	199.4	202.0	187.4	186.3	
<b>Stocks</b>	<b>310.7</b>	<b>308.5</b>	<b>266.3</b>	<b>264.3</b>	<b>282.9</b>	<b>271.0</b>	
	169.9	164.2	127.2	124.7	142.7	127.5	

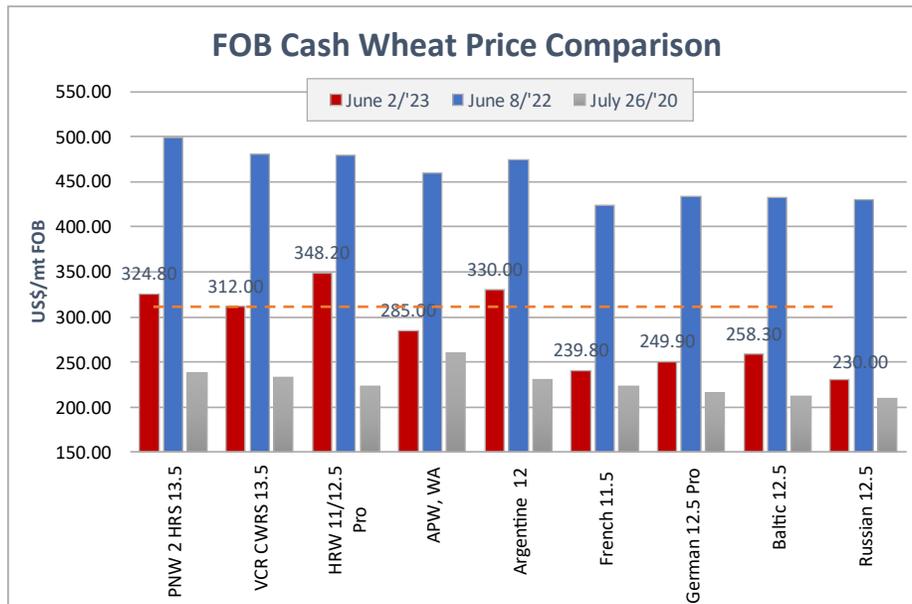
Data shown in the second rows refer to world aggregates without China.  
Source: AMIS

- According to AMIS, **global wheat production** in 2023 is forecast to fall by three per cent from the 2022 record, with the bulk of the decline expected in Australia and the Russian Federation.

<sup>1</sup> AMIS: Agricultural Market Information System. Input comes from the ten organizations that form the AMIS Secretariat: FAO, IFAD, IFPRI, IGC, OECD, UNCTAD, World Bank Group, WFP, WTO, GLAM.

- **Global wheat utilization** is expected to remain near the 2022/2023 level; growth in food consumption is seen balancing declines in feed use (mostly in China and India) and other use (largely in India).
- **Global wheat trade** in 2023/2024 (July/June) likely to contract by three per cent from the 2022/2023 record, *mainly reflecting lower demand expected from China and the EU*, and smaller shipments from Australia and Ukraine.
- **Global wheat ending stocks** (ending in 2024) are forecast to decline by 0.7 per cent below opening levels, led by a drawdown in the Russian Federation, and smaller declines in the EU, Kazakhstan, the United States, and several countries in Asia.

### FOB Wheat Price Comparison



- FOB wheat prices have adjusted down further. Russian wheat effectively seems to be at U.S. \$230.00/mt. French & German wheat at U.S. \$239.80 and \$249.90/mt FOB, respectively.
- U.S. wheat remains uncompetitive internationally with HRW at \$312.00/mt FOB Gulf.

### ➤ Global wheat production and trade:

There is a lot of competition in the wheat markets as wheat is produced around the world. Below is a brief synopsis on last week's market events in the major wheat origins.

#### **Futures:**

- July 2023 contract Chicago winter wheat closed at \$619-0, up 8-2 cents on Friday, *up 3 cents on the week*.
- July 2023 contract Kansas hard red winter wheat closed at \$812-2, up 9-6 cents on Friday, *down 7 cents on the week*.
- July 2023 Minneapolis hard red spring wheat closed at \$807-6, up 18-6 cents on Friday, *down 5-8 cents on the week*.
- In the US, HRW and HRS markets are up by 5-12 cents/bu this Monday morning. *Marché à Terme International de France (MATIF)* milling wheat is up by €2.52-\$4.75/mt this Monday.

**CBOT July 2023 Wheat (1 yr.)**



**KC July 2023 Wheat**

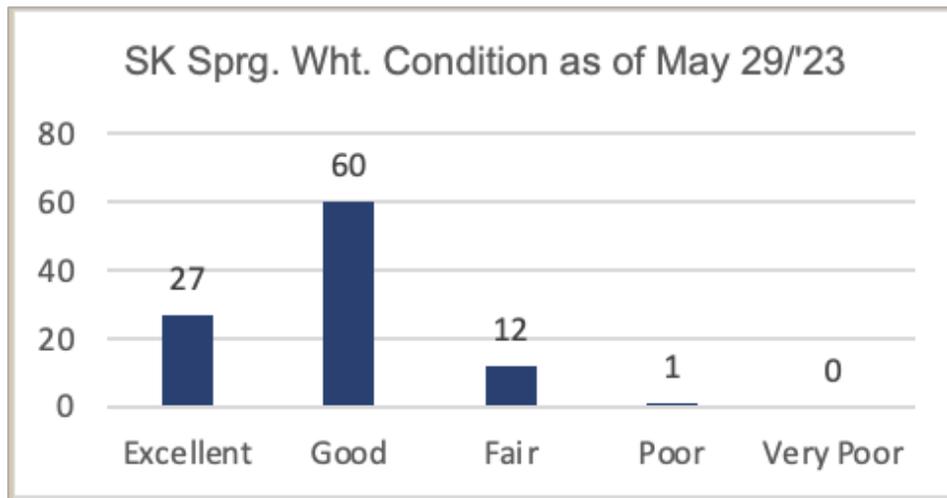


**Mpls. July 2023 Wheat**



**Canadian Wheat**

- Growing conditions: Saskatchewan Ag showed **SK** spring wheat 91 per cent as of May 29. Average five-year progress at that date is 93 per cent. *SK AG is reporting 87 per cent of seeded spring wheat in good to excellent condition*, 12 per cent in fair condition, and one per cent in poor condition. About 48 per cent of spring wheat acres are in Saskatchewan. Another 17 per cent of acres are in **Manitoba** (also in good condition), but the remaining roughly 35 per cent spring wheat acres are in **Alberta**, where we endure major moisture deficits (65 per cent of Alta. soils show poor to fair conditions).



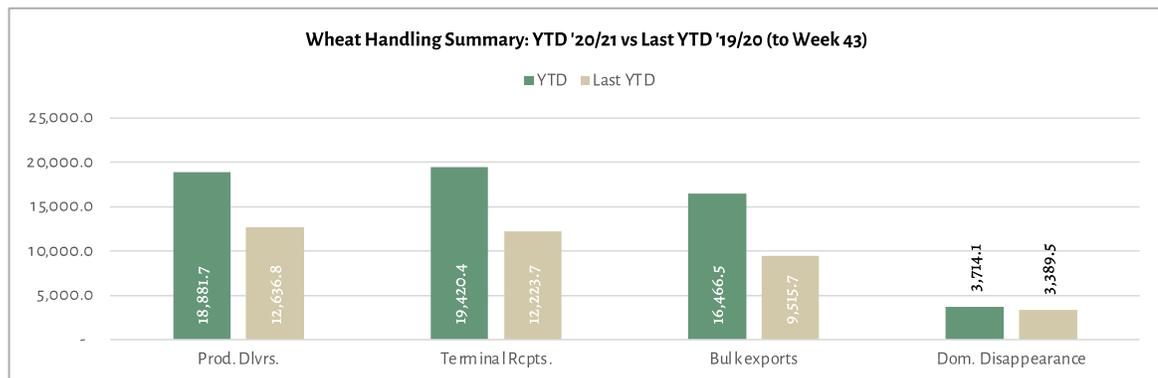
- **U.S. spring wheat:** Favourable weather has continued to allow for excellent seeding progress. Overall, crop development is well ahead of last year and in-line with the five-year average; emergence is 88 per cent in South Dakota, 65 per cent in Minnesota, 63 per cent in Montana and 41 per cent in North Dakota. According to USDA, 43 per cent of the South Dakota crop is in good to excellent condition. Spring wheat crop conditions are not yet available for Minnesota, Montana or North Dakota, but the North Dakota crop is coming up nicely with good stands.
- MATIF milling wheat in Europe was up on Friday, but like in the U.S., remained down for the week (-€4.25/mt on the Sept.) with little actual news other than the pending Saudi Arabian tender. There is still no transparency on the Russian floor price for wheat (does it still exist, and if so, what is it), and there is a wide range of freight estimates for the tender following the recent slump in the freight market. Romanian 12.5 pro wheat was reported offered yesterday ~\$237/mt, and with a freight advantage over Russia, so Russian wheat will have to be aggressive again to get the business. Weather is still an issue: too dry in N Europe, Ukraine and Russian spring wheat regions, too wet and cold in Russian winter wheat regions.
- Russia has reportedly again blocked the grain corridor.

- At 341k mt, **Canadian wheat exports** in week 43 are just below the YTD weekly average of 382k mt. YTD wheat exports reached 16.5 million mt and are seven million mt higher than last year's exports.

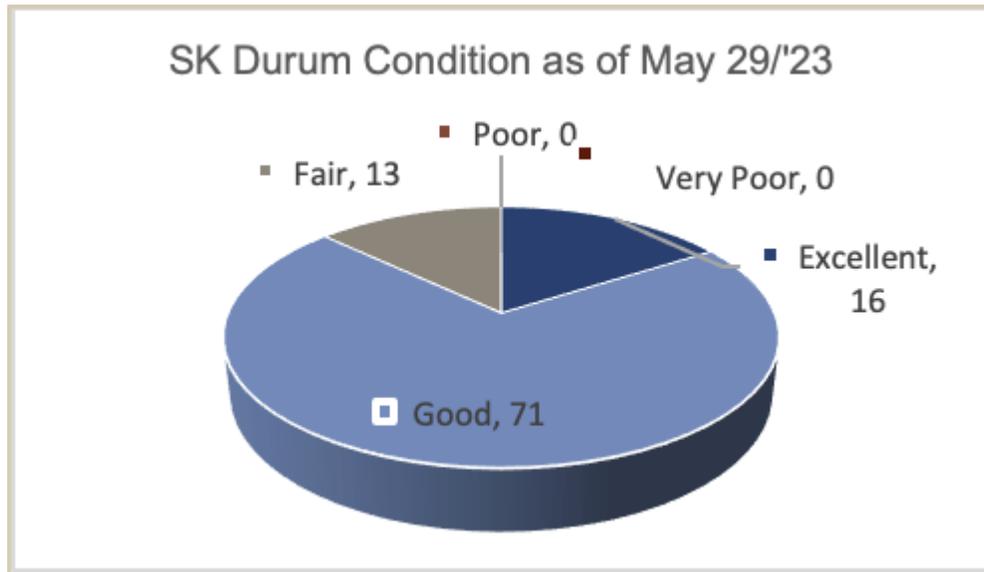
(CGC) Grain Handling Summary Wheat			Week 43		(to May 28/'23)
('000 mt)	Prod. Dlvs.	Terminal Rcpts.	Bulk exports	Dom. Disappearance	
Week 43	278.4	334.0	<b>340.9</b>		<b>164.9</b>
Week ago	194.3	298.6	144.4		109.1
YTD	18,881.7	19,420.4	16,466.5		3,714.1
Last YTD	12,636.8	12,223.7	9,515.7		3,389.5
<b>YTD less Last YTD</b>	<b>6,244.9</b>	<b>19,500.2</b>	<b>6,950.8</b>		<b>324.6</b>
<b>YTD over Last YTD</b>	<b>149%</b>	<b>159%</b>	<b>173%</b>		<b>110%</b>

Source: Mercantile based on CGC data

- Cash prices have continued to weaken with aggressive offers by Russia, but there also is uncertainty about weather developments/growing conditions for the 2023 crop.



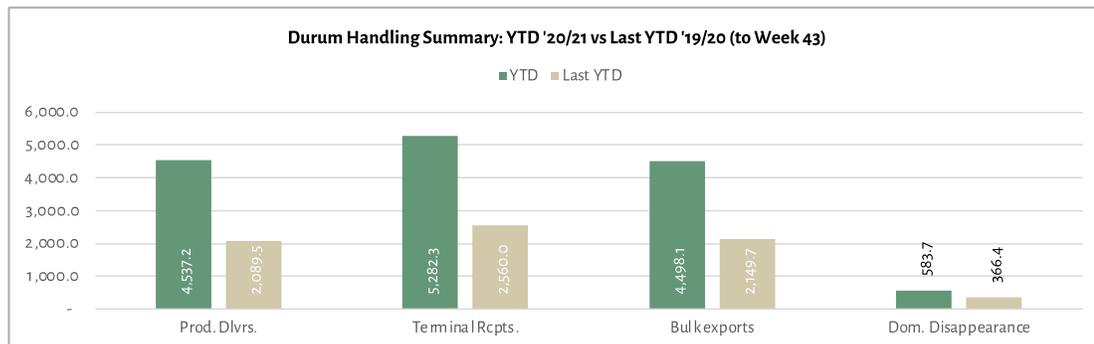
- Durum:** Crop conditions: SK Ag assessed seeding progress for SK durum wheat at 88 per cent as of May 29, compared to the average five-year progress at that date of 97 per cent. Alta. is done seeding.
- SK AG is reporting 87 per cent of seeded durum wheat in good to excellent condition, 13 per cent in fair condition, and zero per cent in poor condition. About 83 per cent of spring wheat acres are in Saskatchewan. Another 17 per cent of acres are in Alta., where there are major moisture deficits (65 per cent of Alta. soils show poor to fair conditions).



- **U.S. durum:** U.S. durum planting made quick progress with North Dakota 73 per cent complete and Montana 78 per cent as of May 30. Emergence in North Dakota is up to 25 per cent this week and 48 per cent in Montana. Official durum crop condition reports are not yet available, but we are told the emerging crop looks good.
- **Canadian durum exports** for week 43 at 15k mt were unusually small; the YTD weekly average is 105k mt. The YTD total export volume of 4.5 million mt, is more than double last year's exports.

(CCC) Grain Handling Summary Durum	Week 43		(to May 28/'23)	
('000 mt)	Prod. Dlvs.	Terminal Rcpts.	Bulk exports	Dom. Disappearance
Week 43	38.0	48.2	14.5	7.1
Week ago	20.1	71.1	102.6	9.2
YTD	4,537.2	5,282.3	4,498.1	583.7
Last YTD	2,089.5	2,560.0	2,149.7	366.4
<b>YTD less Last YTD</b>	<b>2,447.7</b>	<b>2,722.3</b>	<b>2,348.4</b>	<b>217.3</b>
<b>YTD over Last YTD</b>	<b>217%</b>	<b>206%</b>	<b>209%</b>	<b>159%</b>

Source: Mercantile based on CGC data



- Again, Agriculture and Agri-Food Canada projects 2022/2023 durum exports to reach 4.8 million mt, which would leave just 309k mt to ship over the next nine weeks. We think this year's exports could reach 5.2 million mt, reducing ending stocks accordingly.
- We are sold out of old crop and would wait before selling additional new crop.

#### **U.S. Wheat:**

- **U.S. harvest:** Sporadic, sometimes heavy rains continued across much of the HRW growing region, slowing harvest progress in Texas; harvest has begun in Oklahoma. In Alabama, 14 per cent of the SRW crop is now harvested and test cutting has begun in Arkansas and Tennessee. *HRS and durum farmers made excellent progress with planting, well ahead of last year's slow pace.* The SW conditions in the PNW remain quite good.
- Following the U.S. Memorial Day holiday last Monday, wheat futures ended the week mixed. Mid-week, futures dropped, with some contracts reaching lows not seen since 2020.
- The weekly **U.S. wheat export sales** report showed 2022/2023 crop cancelations of 210k mt, a marketing-year low, but up noticeably from the previous week. Total wheat commitments were at 685 million bu as of May 25, *which is 88.3 per cent of the forecast with one week left in the season.* New crop sales were shown at 466k mt, bringing the forward book to 2.7 million mt. - In contrast, the European Commission put the season's wheat exports at 28.4 million mt through May 28, up 11 per cent from last year's pace.
- The Saudi Arabian tender will have no impact on U.S. grains as the nominal Russian price is still close to \$120 below HRW values in the Gulf.
- U.S. HRS for July 2023 was valued at \$324.80/mt FOB PNW (*down \$15.30/mt from last week*), FOB Gulf HRW 11/12.5 pro is valued at \$348.20/mt (*down \$9.30/mt from last week*).

#### **Australian Wheat:**

- Australia has so far avoided the worst of the El Nino effects and new crop futures hit contract lows midweek last week.
- A note on stats: Both the USDA and ABARES are using close to trend yield in their 28-29 million mt crop estimates, but in El Nino years, Australian yields can drop from 5-50 per cent below trend yields. September is a key month for the Australian crop, which is exactly when El Nino is anticipated to peak.
- FOB values in Australia: July 2023 AWP, WA is valued at \$285.00/mt (*Up \$5/mt from last week*).

#### **Argentine Wheat:**

- In Argentina, BAGE estimated plantings to be six per cent complete on an expected 6.3 million ha total. This is down from their original 6.7 million ha estimate and is now below the USDA's 6.5 million ha harvested number.
- July 12 per cent pro Argentine wheat is quoted at U.S. \$330.00/mt FOB (unchanged from last week).

#### **China Wheat:**

- According to the state weather forecasters last Thursday, China's largest wheat-growing province Henan is expected to be hit by more rain in the coming days. This would further complicate efforts to harvest grain damaged by abnormally heavy precipitation in late May. The south of Henan had been struck by higher-than-normal rainfall in the last week of May days ahead of the harvest of wheat planted last winter. - According to some (unconfirmed) sources, an estimated 30 million of the 137 million mt expected crop is being deemed unfit for human consumption.

#### EU Wheat:

- European forecasts show rain in the south and Balkans but leave the bulk of crops in the north dry.
- Still, according to FranceAgriMer, wheat ratings hover at record-high levels, demonstrating the potential for an above-average crop in Europe.
- The European Commission put the season's wheat exports at 28.4 million mt through May 28, up 11 per cent from last year's pace.
- Brussels raised their 2023/2024 ending stocks 9.5 million tonnes above the USDA.
- EU FOB prices: July 2023 French 11.5 pro wheat closed at \$239.80/mt (*down \$7.00/mt from last week*); July 2023 German 12.5 pro wheat closed at \$249.90 (*up \$3.10/mt from last week*); July 2023 Baltic 14.0 pro wheat closed at \$258.30/mt (*down \$1.90/mt from last week*).

#### Black Sea Wheat:

- There is still no transparency on the Russian floor price for wheat (does it still exist, and if so, what is it), and there is a wide range of freight estimates for the tender following the recent slump in the freight market.
- Regarding the Saudi Arabian tender for wheat, Romanian 12.5 pro wheat was reported offered on Thursday at ~\$237/mt, and with a freight advantage over Russia, Russian wheat will have to be aggressive again to get the business.
- Weather is still an issue: too dry in Northern Europe, Ukrainian and Russian spring wheat regions, too wet and cold in Russian winter wheat regions.
- Russia has reportedly again blocked the corridor.
- Estimated FOB prices for July 12.5 protein Russian wheat: US\$230/mt (*down \$15/mt from last week*).

#### ➤ Significant purchases/ trades:

- **Korea** bought 65kmt of feed wheat for Nov. arrival at \$259/mt, reportedly basis Black Sea (i.e., Balkan as Ukraine and Russian load ports were excluded).
- **Saudi Arabia** tendered Friday for 480k mt of wheat for Sept-Oct arrival. There are no official results yet, but hear that Saudi Arabia booked 634k mt at various ports at ard. \$262/mt C&F. Freight should be min. \$42/mt, but hard to peg down right now.
- The **Baltic Panamax index** has fallen by 45 per cent in the last eight weeks.
- Weekly **U.S. sales**: 2022/2023 crop cancelations of 210k mt, a marketing-year low, but up noticeably from the previous week. New crop sales were shown at 466k mt, bringing the forward book to 2.7 million mt.

#### ➤ Wheat Market Outlook:

##### Significant events over the past week:

- **Wheat futures** followed corn, closing the week slightly higher in Chicago, but down in Kansas and Minneapolis.
- So far reports suggest the **spring wheat crop** in North America is doing well.
- According to **FranceAgriMer**, wheat ratings hover at record-high levels, demonstrating the potential for an above-average crop in Europe.
- The **European Commission** put the season's wheat exports at 28.4 million mt through May 28, up 11 per cent from last year's pace, but Brussels also raised their 2023/2024 ending stocks 9.5 million tonnes above the USDA.
- **Australia** has so far avoided the worst of the El Nino effects.
- **China's** largest wheat-growing province Henan is expected to be hit by more rain in the coming days. This would further complicate efforts to harvest grain damaged by abnormally heavy precipitation in late May.

- **Saudi Arabia** tendered Friday for 480k mt of wheat for Sept-Oct arrival. There are no official results yet, but hear that Saudi Arabia booked 634k mt at various ports at ard. \$262/mt C&F; freight should be min. \$42/mt, but hard to peg down right now. – This would put Russian wheat at \$230.00/mt (or lower).

**Outlook:**

Mercantile says current weather conditions are benign, and their reports suggest an average to above average global crop is possible. On the demand side, Mercantile believes there are poor local exchange rates and belt tightening keeps demand low. Currently Russian wheat is the cheapest milling wheat and best priced feed grain for many buyers, according to Mercantile. In the meantime, Mercantile expects futures to open initially stronger, but weaker by the end of the week, assuming no weather catastrophe. Mercantile would sell more spring wheat to 50 per cent committed.

**iii) Primary Elevator Price Tables and Grade Spreads**

**Table 1: Canadian Primary Elevator Bids, in Canadian Dollars per Bu and per MILLION MT**

Date: 05-06-2023					
NW Sask	Spot		NW Sask	Deferred	
	(bu.)	(mt)		Sept. '23 (bu.)	Sept.'23 (mt)
1 CWRS 13.5	\$10.90	\$400.51	1 CWRS 13.5	\$9.39	\$345.03
1 CWAD 13.0	\$10.81	\$397.20	1 CWAD 13.0	\$9.60	\$352.74
1 CPSR 11.5	\$9.62	\$353.48	1 CPSR 11.5	\$8.81	\$323.71
SW Sask			SW Sask		
1 CWRS 13.5	\$9.90	\$363.77	1 CWRS 13.5	\$9.30	\$341.72
1 CWAD 13.0	\$10.75	\$395.00	1 CWAD 13.0	\$9.57	\$351.64
1 CPSR 11.5	\$9.45	\$347.23	1 CPSR 11.5	\$8.73	\$320.78
NE Sask			NE Sask		
1 CWRS 13.5	\$9.83	\$361.19	1 CWRS 13.5	\$9.12	\$335.11
1 CWAD 13.0	\$10.65	\$391.32	1 CWAD 13.0	\$9.57	\$351.64
1 CPSR 11.5	n/a		1 CPSR 11.5	n/a	
SE Sask			SE Sask		
1 CWRS 13.5	\$9.77	\$358.99	1 CWRS 13.5	\$9.11	\$334.74
1 CWAD 13.0	\$10.69	\$392.79	1 CWAD 13.0	\$9.61	\$353.11
1 CPSR 11.5	\$9.25	\$339.88	1 CPSR 11.5	\$8.49	\$311.96

Data source: PDQ, June 5/'23

**Table 2: Grade Spreads, in Canadian Dollars per Bu and per MILLION MT**

Avg. Grade Spread/ Pro Discounts	Cdn\$/bu.	Cdn.\$/mt
1 CWRS 14.0	0.05	1.89
1 CWRS 13.5	Base Grade	Base Grade
2 CWRS 13.5	(0.10)	-3.67
1 CWRS 12.5	(0.30)	-11.02
1 CWAD 13.0	Base Grade	Base Grade
1 CWAD 13.5	0.00	0.00
2 CWAD 13.0	(0.10)	-3.67
2 CWAD 12.5	(0.15)	-5.51

Data source: PDQ, June 5/'23

#### **iv) FOB Wheat Prices and Export Basis Calculation**

##### Background and Rationale:

Reporting FOB prices at port position and primary elevator prices allows the reader to gain an understanding of both local and international wheat prices and to understand the relationship between the two, as measured by the export basis. Export basis can be defined as FOB port position prices minus the primary elevator prices at any given prairie delivery location and is therefore reflective of transportation costs plus any premiums being captured by terminal grain elevator companies or the railway companies, at any given time.

In general, a widening basis is indicative of decreasing system performance in terms of either reduced port capacity or rail service, or both. A narrowing basis is indicative of increased available port capacity and/or better ability of the railways to provide ample service to grain shippers. In this regard, tracking these prices over time has value both in terms of producers being able to time the selling of their grain but also in terms of evaluating and setting policy related to various transportation and capacity issues.

Gray (2015) has calculated a normal basis to be in the range of C\$72/million mt. During the 2013/2014 crop year the export basis for wheat widened to approximately C\$250/million mt, which indicated an inability of the grain handling and transportation system to adequately handle the record crop produced that year. This occurrence has highlighted the need to improve the level of rail service and take measures to expand port capacity where possible. It has also underscored the need for better price transparency and market information within the grain sector.

##### Assumptions, Definitions, and Methodology

The following background information should assist in understanding and interpreting international market signals and to relate them to the 'local' Saskatchewan wheat market:

- The price information generated for the weekly report is designed to show farmers at what price levels several wheat classes are trading at local primary elevators (Table 1) and in nearby international markets (Table 3). To express the Export Basis<sup>2</sup> (see *Export Basis* in Table 3) defined as Canadian FOB Prices minus primary elevator bids, the FOB prices are translated into Canadian dollars from US dollars and compared to current actual primary elevator Street prices at Rosetown, Saskatchewan (see *Street Prices* in Table 3). Rosetown is used as a proxy for all primary elevators in the basis calculation. The actual handling and transportation costs from the West Coast to delivered elevator (Rosetown area) range from ~C\$58.00-C\$74.72/million mt, depending on number of cars moved and elevator used.
- Approximate relationship between U.S. wheat classes and Canadian wheat classes:
  - DNS 14 per cent in the Pacific Northwest (PNW) ≈ 1 CWRS 13.5 per cent in Vancouver
  - HRS in the Pacific Northwest (PNW) ≈ 2 CWRS 13.0 per cent in Vancouver
  - HRW in the Pacific Northwest (PNW) ≈ 3 CWRS in Vancouver
  - SW (lowest price wheat) ≈ CPS red (mostly fed domestically)
  - HAD (Lakes) ≈ CWAD (Thunder Bay/ Lawrence)
    - Abbreviations: DNS (Dark Northern Spring Wheat); HRS (Hard Red Spring Wheat); HRW (Hard Red Winter Wheat); SW (Soft Wheat); HAD (Hard Amber Durum Wheat); CWRS (Canadian Western Red Spring Wheat); CPS (Canada Prairie Spring Wheat); CWAD (Canadian Western Amber Durum Wheat)
- Hard wheat price calculations:  
Exporters in Western Canada generally derive their primary elevator wheat prices from HRS values at the West Coast (Pacific Northwest - PNW). Similarly, HRW values are used for lower grade (3) CWRS.
  - West Coast HRS and HRW values essentially dominate the international hard wheat trade and determine its basic value.
  - If premiums are paid for 1 CWRS 13.5, elevator companies are often able to retain the premium.
- Durum wheat price calculations:  
The primary export route for Canadian durum wheat is still through Thunder Bay, not the West Coast of Canada.
  - Nevertheless, the Pacific Coast has increased in importance for durum over time with 38 per cent of total export volume crop year to date.
  - Italy is the single biggest buyer of Canadian durum wheat with 27 per cent of total Canadian durum exports YTD (East Coast shipments).
- Optional origin grain sales:

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<sup>2</sup> Gray, R.S. (2015). The Economic Impacts of Elevated Export Basis Levels on Western Canadian Grain Producers 2012/13, 2013/14 and 2014/15.

“The difference between FOB Vancouver prices and the Saskatchewan elevator cash bids to producers is referred to as export basis: Basis can refer to the difference between any two prices. As the largest volume port, Vancouver FOB, minus the elevator bid prices representative measure of the “export” basis for grains in Western Canada.”

Most major international grain companies sell 'optional origin' wheat to their customers and often cover their sales 'at best' closer to the shipment position. The Canadian grain system is not conducive to servicing optional origin sales because the volume of wheat kept in storage in port today is much smaller than prior to deregulation of the Canadian wheat market.

**Table 3: Relevant FOB Prices and calculated Basis, U.S. & Canadian Dollars per MT**

Relevant FOB Prices and Export Basis				05-06-2023
Type of Wheat	FOB Prices CDA <sup>1</sup> (calculated)		Street Prices	Export Basis <sup>2</sup>
	West Coast (Cdn./mt\$)	Great Lakes (Cdn.\$/mt)	Rosetown (Cdn.\$/mt)	Basis: West Coast-Centr. SK (Cdn\$/mt)
DNS 14.0	\$449.72	\$503.46		
HRS	\$442.32			
HRW 11.5	\$443.80			
SWW 12.0	\$361.94			
1 CWRS 13.5 <sup>3</sup>	\$449.72		\$369.64	\$80.07
2 CWRS 13.0 <sup>3</sup>	\$442.32		\$357.89	\$84.43
3 CWRS <sup>3</sup>	\$443.80		\$348.33	\$95.46
CPS <sup>3</sup>	\$355.04		\$346.13	\$8.91
1 CWAD <sup>4</sup>		\$496.56	\$396.84	\$99.73
Competing wheat:	US\$/mt			
Russia 12.5 (Black Sea, 25k mt)	\$230.00	July '23		
French 11.5 (Rouen)	\$239.80	July '23		
APW 10.5 (W Coast)	\$285.00	July '23		
Argentine 12.0	\$330.00	July '23		

<sup>1</sup> FOB Prices CDA = FOB US\$ converted into Canadian Currency

<sup>2</sup> Export Basis = FOB Prices CDA minus Cdn. Street Price

<sup>3</sup> DNS 14% ≈ 1 CRWS 13.5%; HRS ≈ 2 CWRS 13.0%; HRW ≈ 3CWRS; SWW ≈ CPS

<sup>4</sup> Values derived to Lakehead FOB